

AN ESTIMATE OF THE MIGRATORY TIMING AND ABUNDANCE OF
SOCKEYE SALMON INTO UPPER COOK INLET, ALASKA, IN 1999

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ABSTRACT

During the 1999 Upper Cook Inlet, Alaska commercial salmon fishing season a test fishery was used to estimate the timing of the sockeye salmon *Oncorhynchus nerka*, run as it passed a transect along the southern boundary of the management area. The test fishery operated from 1 July to 31 July and captured 3,075 sockeye salmon representing 2,226 CPUE points. Mean date of the run was 18 July, and the test fishery encompassed approximately 95.1% of the total run.

KEY WORDS: Salmon, *Oncorhynchus*, Upper Cook Inlet, Alaska, test fishery, migratory behavior

INTRODUCTION

In 1979 the Alaska Department of Fish and Game (ADF&G) began a test fishing project near the southern boundary of the Upper Cook Inlet (UCI) salmon management area (Figure 1). The objective of this project was to estimate the total run of sockeye salmon *Oncorhynchus nerka*, to UCI before salmon reached commercial harvest areas. Such information has helped ADF&G management biologists set commercial fishing times and areas to harvest sockeye salmon surplus to spawning needs. Test fishing results have been reported annually since 1979 (Waltemyer 1983a, 1983b, 1986a, 1986b, Hilsinger and Waltemyer 1987, Hilsinger 1988, Tarbox and Waltemyer 1989, Tarbox 1990, 1992, 1994, 1995, 1996, 1997, 1998a, 1998b). This report presents the results of the 1999 test fishing project.

METHODS

Test Fishing

Sockeye salmon returning to Upper Cook Inlet were sampled by fishing geographically fixed stations between Anchor Point and Red River Delta (Figure 1). Stations were numbered consecutively from east to west. Station locations were determined from LORAN C coordinates. A chartered test fishing vessel sampled stations 4 - 8 daily.

Sampling started on 1 July and continued through 30 July. The chartered vessel, *F/V Corrina Kay*, fished 366 m (1,200 ft) of 2.1 cm (5 1/8 in) multi-filament gill net during test fishing. Drift gill net web had a filament size number of 53/S6F, was 45 meshes deep, and was constructed of double knot Super Crystal shade number 1.

All salmon captured were identified to species. All sockeye salmon were measured for length (mid-eye to fork-of-tail in mm). The number of each species caught at each station was expressed as a catch per unit of effort (CPUE) statistic:

$$CPUE_s = \frac{100 \text{ fm} \times 60 \text{ min} \times \text{number of fish}}{\text{fm of gear} \times \text{MFT}}, \quad (1)$$

where: $CPUE_s$ = CPUE for station s, and
MFT = mean fishing time.

Mean fishing time was calculated as:

$$\text{MFT} = (C - B) + \frac{[B - A] + [D - C]}{2} \quad , \quad (2)$$

where: A = time net deployment started,
B = time net fully deployed,
C = time net retrieval started, and
D = time net fully retrieved.

Once deployed at a station, gill nets were fished 30 min before retrieval started.

Daily CPUE (CPUE_d) was calculated as:

$$\text{CPUE}_d = \sum_{s=1}^n \text{CPUE}_s \quad (3)$$

The following physical and chemical measurements were taken at the start of each set: air temperature, water temperature (at 1 m below the surface), wind velocity and direction, tide stage, water depth, and water clarity. Air and water temperatures were measured using a YSI salinity/temperature meter. Wind speed was measured in knots and direction was recorded as 0 (no wind), 1 (north), 2 (northeast), 3 (east), 4 (southeast), 5 (south), 6 (southwest), 7 (west), or 8 (northwest). Tide stage was classed as flood, ebb or slack by observing the movement of the vessel while drifting with the gill net. Water depth was measured in fm using a Simrad echo sounder, and water clarity was measured in m using a 17.5 cm secchi disk.

Describing the Salmon Migration

Catchability, the fraction of the available population taken by a defined unit of fishing effort, was estimated as:

$$q_d = c_d / r_d \quad , \quad (4)$$

where: q_d = estimated catchability on day d ,
 r_d = adjusted cumulative total return on day d , and
 c_d = cumulative CPUE on day d .

Passage rate, the expansion factor used to convert CPUE into estimated numbers of salmon passing the test fishing transect, was calculated as:

$$PR = 1/q_d = \text{passage rate} \quad (5)$$

Since the test fishery did not encompass the entire sockeye salmon run, the total CPUE for the test fishery was estimated after the season using the following relationship:

$$CPUE_t = CPUE_f \times \frac{H_t}{H_{(f+2)}}, \quad (6)$$

where: $CPUE_t$ = total estimated CPUE for the season,
 $CPUE_f$ = cumulative CPUE through final day, f , of test fishing,
 H_t = total commercial harvest for the season
 $H_{(f+2)}$ = total commercial catch through final day of test fishery ($f+2$), and
 2 = number of days it took salmon to travel from test fishery to commercial harvest areas.

Estimates of $CPUE_t$ and $CPUE_d$ values were used to estimate daily and cumulative proportions of $CPUE_t$, based on a non-linear model:

$$y_d = 1/(1 + e^{-(a+bx)}) \quad (7)$$

where: y_d = cumulative proportion of CPUE or return on day d ,
 a and b = coefficients of model,
 d = day of observation.

To calculate mean date of return, the following formula was used:

$$M = a/b \quad (8)$$

where: M = mean date of return.

RESULTS AND DISCUSSION

A total of 3,075 sockeye salmon, 31 pink salmon *O. gorbuscha*, 451 chum salmon *O. keta*, 404 coho salmon *O. kisutch*, and 7 chinook salmon *O. tshawytscha*, were captured during the 1999 test fishery (Table 1, Appendices A-D). Daily sockeye salmon catches ranged from 3 to 514 fish (Table 1).

Sockeye salmon daily CPUE values ranged from 25 on 3 July to 300.9 on 15 July. Cumulative total CPUE for the duration of the project was 2,226 (Table 1). Using post season commercial harvest figures, test fishing spanned approximately 94.3% of the total run. Therefore, total CPUE for the test fishery would have been 2,360 if test fishing had continued throughout the duration of the run.

Sockeye salmon catches along the transect were similar to the distribution of CPUE values (Tables 2 and 3).

Examination of daily and cumulative proportions (estimated post season) of the sockeye salmon run to UCI suggested that 2.7% of the run had passed the transect prior to the start of test fishing on 1 July and that the run was 95.1% completed at project termination (Appendix E; Figure 2). The mean date of the run was 18 July, which was three days late relative to the historic average (Table 4).

The total sockeye salmon run to UCI in 1999 was estimated to be 4.5 million fish of which 2.668 million were harvested in the commercial fishery. Estimated passage rate for the season was 1,906 sockeye salmon per CPUE index point.

Water temperatures measured along the transect were 8-10° C early in July and then warmed to a high of 12.5° C toward to the end of July (Appendix F). Air temperatures fluctuated between 11°C and 19°C during the project (Appendix F). Wind velocities were generally high. Winds of 20 knots or greater were recorded on 12 days (Appendix F). Wind direction was variable.

During the commercial salmon fishing season four estimates of the sockeye salmon total run were made (Appendix G). The first estimate was made on 16 July. The passage rate estimate was 1,628 sockeye salmon per index point. The best fit was 1990 with a total CPUE estimate was 2,931 for a

total return estimate of 4.77 million fish. The second best fit was for 2,332 index points and a total return of 3.78 million sockeye salmon. The second estimate was made following the commercial fishery of 19 July. Passage rate and total sockeye salmon CPUE was estimated at 2,942 and 1,777, respectively. The total return was estimated at 5.2 million fish. The next best fit followed the 1992 entry pattern and timing and estimated a total return of 4.3 million fish. On 25 July a total return estimate of 3.9 million fish was made using a total CPUE estimate of 2,341 and the passage rate estimate of 1,683. The final estimate was made on 29 July. A total of 2,326 index points and passage rate of 1705 resulted in an estimate of 3.965 million fish.

The 1999 season was characterized by a fairly consistent passage rate and stability in the estimates compared to previous years. As in past years the second best fit (1992) on 15 July was the best fit by the end of the season. However, this year the range of estimates of 3.78 to 5.2 million sockeye salmon was accurate enough to prosecute the commercial fisheries without major disruption.

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Table 1. Summary of sockeye salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1999.

Date	Number of Stations	Mean Fishing Time (min)	Catch		CPUE		Mean Length (mm)
			Daily	Cumul.	Daily	Cumul.	
01-Jul	6	218.5	18	18	14.6	14.6	525
02-Jul	6	221.5	16	34	12.8	27.4	532
03-Jul	6	217.0	3	37	2.5	29.9	537
04-Jul	6	238.0	87	124	62.6	92.5	542
05-Jul	6	198.5	37	161	29.8	122.3	540
06-Jul	6	221.5	27	188	21.5	143.8	530
07-Jul	6	221.0	19	207	15.0	158.7	544
08-Jul	6	228.0	59	266	51.2	210.0	530
09-Jul	6	231.5	78	344	58.6	268.6	547
10-Jul	6	221.5	73	417	59.3	327.9	567
11-Jul	6	243.5	222	639	151.1	479.0	550
12-Jul	6	233.0	112	751	78.2	557.2	549
13-Jul	6	230.5	98	849	64.9	622.1	541
14-Jul	6	228.0	90	939	54.6	676.8	548
15-Jul	6	276.0	514	1453	300.9	977.7	556
16-Jul	4	197.0	279	1732	157.7	1135.4	557
17-Jul	6	239.0	183	1915	135.0	1270.4	551
18-Jul	6	228.5	103	2018	79.6	1350.0	558
19-Jul	6	228.0	94	2112	70.2	1420.3	545
20-Jul	1	27.5	70	2182	99.9	1520.2	
21-Jul	0	-6.0	6	2188	66.9	1587.1	
22-Jul	6	225.5	40	2228	30.3	1617.3	563
23-Jul	6	229.0	164	2392	128.1	1745.4	541
24-Jul	6	239.5	199	2591	123.2	1868.6	575
25-Jul	6	229.5	125	2716	96.4	1965.0	564
26-Jul	6	216.0	42	2758	39.4	2004.4	554
27-Jul	3	113.0	32	2790	25.5	2030.0	563
28-Jul	6	232.0	90	2880	68.2	2098.2	566
29-Jul	6	244.0	164	3044	101.2	2199.4	553
30-Jul	6	219.5	19	3063	15.4	2214.8	522
31-Jul	6	209.5	12	3075	11.1	2225.9	535

Table 2. Estimated sockeye salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	3	3	10	1	0	1	18
02-Jul	0	0	10	0	6	0	16
03-Jul	1	0	0	0	0	2	3
04-Jul	10	0	30	23	19	5	87
05-Jul	13	0	20	4	0	0	37
06-Jul	3	12	9	3	0	0	27
07-Jul	4	2	12	1	0	0	19
08-Jul	10	38	2	0	3	6	59
09-Jul	14	3	45	14	1	1	78
10-Jul	7	3	8	29	26	0	73
11-Jul	13	103	53	51	0	2	222
12-Jul	8	78	24	1	1	0	112
13-Jul	4	76	5	10	1	2	98
14-Jul	56	24	6	4	0	0	90
15-Jul	2	71	71	243	62	65	514
16-Jul			91	70	114	4	279
17-Jul	42	78	32	12	8	11	183
18-Jul	7	20	40	22	9	5	103
19-Jul	51	12	21	3	1	6	94
20-Jul	1	65	1	1	1	1	70
21-Jul	1	1	1	1	1	1	6
22-Jul	20	13	0	6	1	0	40
23-Jul	15	34	61	49	4	1	164
24-Jul	30	142	7	8	12	0	199
25-Jul	19	57	22	24	1	2	125
26-Jul	12	14	3	5	2	6	42
27-Jul		16	13		3		32
28-Jul	0	20	22	16	24	8	90
29-Jul	1	16	1	19	115	12	164
30-Jul	0	3	7	4	0	5	19
31-Jul	0	1	1	4	5	1	12
Total	347	905	628	628	420	147	3075
%	11.3	29.4	20.4	20.4	13.7	4.8	100.0

Table 3. Estimated sockeye salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	2.5	2.6	7.8	0.8	0.0	0.8	14.6
02-Jul	0.0	0.0	7.9	0.0	4.9	0.0	12.8
03-Jul	0.8	0.0	0.0	0.0	0.0	1.7	2.5
04-Jul	8.1	0.0	20.0	16.0	14.4	4.1	62.6
05-Jul	10.5	0.0	16.0	3.2	0.0	0.0	29.8
06-Jul	2.4	9.5	7.1	2.5	0.0	0.0	21.5
07-Jul	3.4	1.6	9.1	0.8	0.0	0.0	15.0
08-Jul	8.1	34.2	1.6	0.0	2.4	4.9	51.2
09-Jul	11.0	2.3	33.3	10.2	0.9	0.8	58.6
10-Jul	5.6	2.4	6.7	23.8	20.8	0.0	59.3
11-Jul	10.4	65.7	37.4	36.0	0.0	1.6	151.1
12-Jul	6.2	52.6	17.8	0.8	0.8	0.0	78.2
13-Jul	3.4	47.0	3.9	8.0	0.8	1.7	64.9
14-Jul	37.7	8.7	4.9	3.3	0.0	0.0	54.6
15-Jul	1.7	49.9	47.8	116.6	39.6	45.4	300.9
16-Jul			48.3	45.1	61.1	3.2	157.7
17-Jul	30.4	57.8	22.3	9.6	6.3	8.6	135.0
18-Jul	5.6	15.8	30.0	16.9	7.2	4.1	79.6
19-Jul	36.4	9.5	16.1	2.5	0.8	4.9	70.2
20-Jul	25.0	60.0	8.0	3.7	0.8	2.4	99.9
21-Jul	25.0	35.0	0.0	3.7	0.8	2.4	66.9
22-Jul	14.9	9.7	0.0	4.9	0.8	0.0	30.3
23-Jul	12.2	24.3	39.3	48.2	3.2	0.8	128.1
24-Jul	25.3	76.1	5.6	6.7	9.5	0.0	123.2
25-Jul	14.8	44.4	17.1	17.6	0.8	1.6	96.4
26-Jul	16.7	10.2	2.3	3.8	1.6	4.7	39.4
27-Jul		13.1	10.0		2.4		25.5
28-Jul	0.0	15.2	16.5	12.0	18.2	6.3	68.2
29-Jul	0.8	12.1	0.8	13.7	63.9	9.7	101.2
30-Jul	0.0	2.5	5.6	3.2	0.0	4.1	15.4
31-Jul	0.0	1.1	0.8	4.3	4.0	0.8	11.1
Total	319.2	663.4	444.3	418.3	266.3	114.5	2225.9
%	14.3	29.8	20.0	18.8	12.0	5.1	100.0

Table 4. Mean date of the sockeye salmon run across Anchor Point transect, Upper Cook Inlet offshore test fish project, 1979-1999.

Year	Mean Date ^a	
	Coded	Calendar
1979	18.4	July 11
1980	22.7	July 15
1981	13.2	July 06
1982	24.2	July 17
1983	22.6	July 15
1984	18.4	July 11
1985	22.7	July 15
1986	23.0	July 16
1987	25.7	July 18
1988	20.6	July 13
1989	21.6	July 14
1990	25.6	July 18
1991	24.3	July 17
1992	24.3	July 17
1993	21.4	July 14
1994	26.2	July 19
1995	22.1	July 15
1996	20.4	July 13
1997	23.6	July 16
1998	24.9	July 18
1999	24.4	July 18
1979-1998	22.3	July 15

^a Day (1) = June 24. File: otf99t4.doc

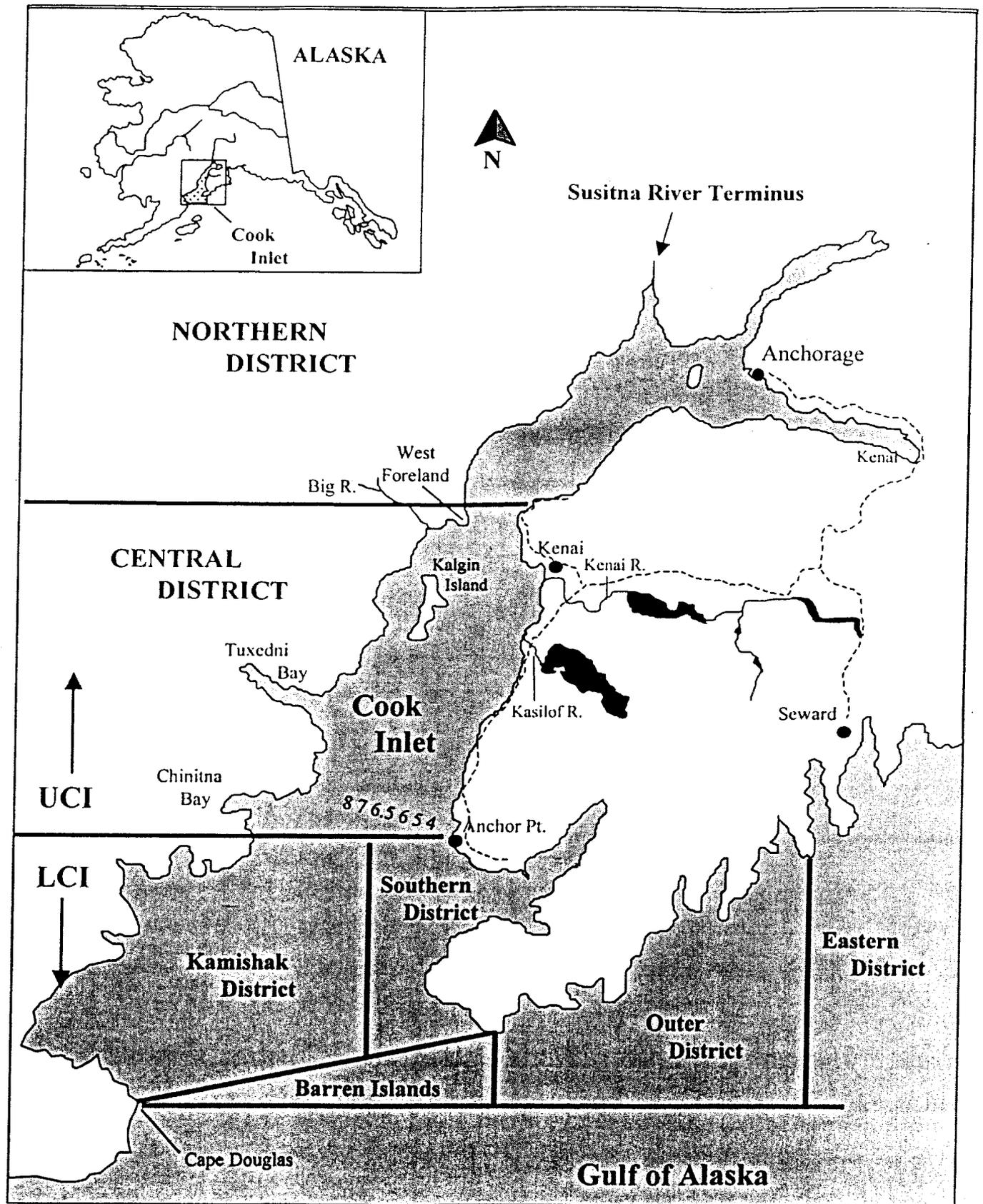


Figure 1. Location of fishing districts and offshore test fish transect in Cook Inlet, Alaska, 1999.

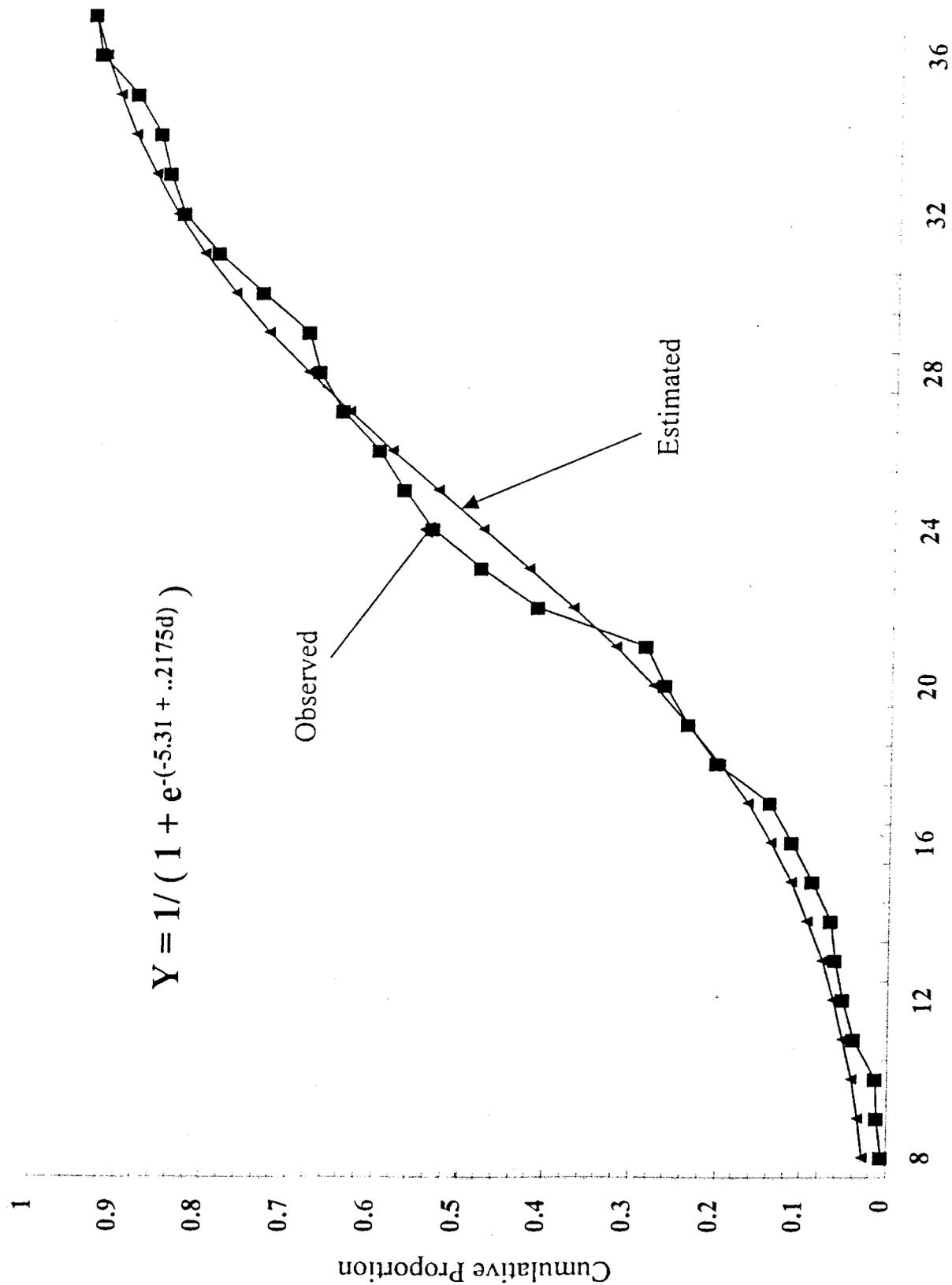


Figure 2. Cumulative proportions estimated for the sockeye salmon return to Upper Cook Inlet, Alaska 1999.
Day - day 1 = 24 June

Appendix A1. Summary of pink salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1999.

Date	Number of Stations	Mean Fishing Time (min)	Catch		CPUE	
			Daily	Cumul.	Daily	Cumul.
01-Jul	6	218.5	1	1	0.8	0.8
02-Jul	6	221.5	2	3	1.6	2.4
03-Jul	6	217.0	0	3	0.0	2.4
04-Jul	6	238.0	1	4	0.8	3.2
05-Jul	6	198.5	0	4	0.0	3.2
06-Jul	6	221.5	0	4	0.0	3.2
07-Jul	6	221.0	1	5	0.8	4.0
08-Jul	6	228.0	0	5	0.0	4.0
09-Jul	6	231.5	2	7	1.5	5.5
10-Jul	6	221.5	0	7	0.0	5.5
11-Jul	6	243.5	2	9	1.3	6.9
12-Jul	6	233.0	1	10	0.8	7.7
13-Jul	6	230.5	0	10	0.0	7.7
14-Jul	6	228.0	1	11	0.8	8.5
15-Jul	6	276.0	1	12	0.6	9.1
16-Jul	4	197.0	1	13	0.5	9.7
17-Jul	6	239.0	1	14	0.8	10.5
18-Jul	6	228.5	3	17	2.4	12.8
19-Jul	6	228.0	5	22	3.9	16.7
20-Jul	1	27.5	0	22	0.0	16.7
21-Jul	0	-6.0	0	22	0.0	16.7
22-Jul	6	225.5	2	24	1.5	18.2
23-Jul	6	229.0	1	25	0.8	19.0
24-Jul	6	239.5	2	27	1.4	20.4
25-Jul	6	229.5	1	28	0.8	21.2
26-Jul	6	216.0	0	28	0.0	21.2
27-Jul	3	113.0	1	29	0.8	22.0
28-Jul	6	232.0	0	29	0.0	22.0
29-Jul	6	244.0	2	31	1.1	23.1
30-Jul	6	219.5	0	31	0.0	23.1
31-Jul	6	209.5	0	31	0.0	23.1

Appendix A2. Estimated pink salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0	0	0	0	1	0	1
02-Jul	1	0	0	1	0	0	2
03-Jul	0	0	0	0	0	0	0
04-Jul	0	0	0	0	0	1	1
05-Jul	0	0	0	0	0	0	0
06-Jul	0	0	0	0	0	0	0
07-Jul	0	0	0	1	0	0	1
08-Jul	0	0	0	0	0	0	0
09-Jul	1	0	0	1	0	0	2
10-Jul	0	0	0	0	0	0	0
11-Jul	0	1	0	1	0	0	2
12-Jul	0	0	0	0	0	1	1
13-Jul	0	0	0	0	0	0	0
14-Jul	0	0	1	0	0	0	1
15-Jul	0	0	0	0	1	0	1
16-Jul			0	0	1	0	1
17-Jul	0	0	0	0	1	0	1
18-Jul	1	1	0	1	0	0	3
19-Jul	1	2	1	1	0	0	5
20-Jul	0	0	0	0	0	0	0
21-Jul	0	0	0	0	0	0	0
22-Jul	1	1	0	0	0	0	2
23-Jul	1	0	0	0	0	0	1
24-Jul	0	1	0	1	0	0	2
25-Jul	0	0	0	0	0	1	1
26-Jul	0	0	0	0	0	0	0
27-Jul		0	1		0		1
28-Jul	0	0	0	0	0	0	0
29-Jul	0	0	0	0	2	0	2
30-Jul	0	0	0	0	0	0	0
31-Jul	0	0	0	0	0	0	0
Total	6	6	3	7	6	3	31
%	19.4	19.4	9.7	22.6	19.4	9.7	100.0

Appendix A3. Estimated pink salmon CPUE by date and station,
Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
02-Jul	0.7	0.0	0.0	0.8	0.0	0.0	1.6
03-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
05-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
08-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09-Jul	0.8	0.0	0.0	0.7	0.0	0.0	1.5
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	0.6	0.0	0.7	0.0	0.0	1.3
12-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
13-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
15-Jul	0.0	0.0	0.0	0.0	0.6	0.0	0.6
16-Jul			0.0	0.0	0.5	0.0	0.5
17-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
18-Jul	0.8	0.8	0.0	0.8	0.0	0.0	2.4
19-Jul	0.7	1.6	0.8	0.8	0.0	0.0	3.9
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jul	0.7	0.7	0.0	0.0	0.0	0.0	1.5
23-Jul	0.8	0.0	0.0	0.0	0.0	0.0	0.8
24-Jul	0.0	0.5	0.0	0.8	0.0	0.0	1.4
25-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jul		0.0	0.8		0.0		0.8
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jul	0.0	0.0	0.0	0.0	1.1	0.0	1.1
30-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4.6	4.3	2.3	5.5	3.9	2.4	23.1
%	19.9	18.6	10.2	23.9	16.8	10.5	100.0

Appendix B1. Summary of chum salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1999.

Date	Number of Stations	Mean Fishing Time (min)	Catch		CPUE	
			Daily	Cumul.	Daily	Cumul.
01-Jul	6	218.5	1	1	0.9	0.9
02-Jul	6	221.5	3	4	2.4	3.3
03-Jul	6	217.0	0	4	0.0	3.3
04-Jul	6	238.0	25	29	17.9	21.2
05-Jul	6	198.5	12	41	9.6	30.8
06-Jul	6	221.5	5	46	4.0	34.8
07-Jul	6	221.0	33	79	25.7	60.5
08-Jul	6	228.0	2	81	1.4	61.9
09-Jul	6	231.5	6	87	4.5	66.4
10-Jul	6	221.5	0	87	0.0	66.4
11-Jul	6	243.5	13	100	8.8	75.2
12-Jul	6	233.0	24	124	17.8	93.0
13-Jul	6	230.5	5	129	3.4	96.4
14-Jul	6	228.0	13	142	10.6	107.0
15-Jul	6	276.0	46	188	30.1	137.1
16-Jul	4	197.0	91	279	51.5	188.7
17-Jul	6	239.0	20	299	14.8	203.5
18-Jul	6	228.5	5	304	3.8	207.3
19-Jul	6	228.0	15	319	11.2	218.5
20-Jul	1	27.5	13	332	15.9	234.4
21-Jul	0	-6.0	6	338	11.8	246.3
22-Jul	6	225.5	10	348	7.5	253.8
23-Jul	6	229.0	21	369	15.6	269.4
24-Jul	6	239.5	4	373	2.7	272.0
25-Jul	6	229.5	22	395	16.9	289.0
26-Jul	6	216.0	15	410	12.1	301.1
27-Jul	3	113.0	2	412	1.6	302.7
28-Jul	6	232.0	19	431	14.5	317.2
29-Jul	6	244.0	16	447	10.0	327.2
30-Jul	6	219.5	2	449	1.6	328.8
31-Jul	6	209.5	2	451	1.9	330.6

Appendix B2. Estimated chum salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0	1	0	0	0	0	1
02-Jul	0	0	1	1	1	0	3
03-Jul	0	0	0	0	0	0	0
04-Jul	0	0	7	7	11	0	25
05-Jul	1	0	11	0	0	0	12
06-Jul	0	2	2	0	0	1	5
07-Jul	2	11	20	0	0	0	33
08-Jul	0	2	0	0	0	0	2
09-Jul	2	0	1	3	0	0	6
10-Jul	0	0	0	0	0	0	0
11-Jul	1	7	0	5	0	0	13
12-Jul	1	2	20	1	0	0	24
13-Jul	0	3	2	0	0	0	5
14-Jul	0	0	10	3	0	0	13
15-Jul	0	30	2	7	7	0	46
16-Jul			43	25	22	1	91
17-Jul	3	16	0	0	0	1	20
18-Jul	0	0	3	1	1	0	5
19-Jul	9	2	2	0	1	1	15
20-Jul	1	8	1	1	1	1	13
21-Jul	1	1	1	1	1	1	6
22-Jul	9	0	0	0	1	0	10
23-Jul	4	3	10	3	0	1	21
24-Jul	0	2	1	0	1	0	4
25-Jul	3	9	2	6	1	1	22
26-Jul	1	4	0	8	2	0	15
27-Jul		2	0		0		2
28-Jul	0	0	6	2	7	4	19
29-Jul	0	4	0	0	11	1	16
30-Jul	0	0	1	1	0	0	2
31-Jul	0	0	0	1	1	0	2
Total	38	109	146	76	69	13	451
%	8.4	24.2	32.4	16.9	15.3	2.9	100.0

Appendix B3. Estimated chum salmon CPUE by date and station,
Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0.0	0.9	0.0	0.0	0.0	0.0	0.9
02-Jul	0.0	0.0	0.8	0.8	0.8	0.0	2.4
03-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04-Jul	0.0	0.0	4.7	4.9	8.3	0.0	17.9
05-Jul	0.8	0.0	8.8	0.0	0.0	0.0	9.6
06-Jul	0.0	1.6	1.6	0.0	0.0	0.8	4.0
07-Jul	1.7	8.8	15.2	0.0	0.0	0.0	25.7
08-Jul	0.0	1.4	0.0	0.0	0.0	0.0	1.4
09-Jul	1.6	0.0	0.7	2.2	0.0	0.0	4.5
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.8	4.5	0.0	3.5	0.0	0.0	8.8
12-Jul	0.8	1.3	14.8	0.8	0.0	0.0	17.8
13-Jul	0.0	1.9	1.6	0.0	0.0	0.0	3.4
14-Jul	0.0	0.0	8.1	2.5	0.0	0.0	10.6
15-Jul	0.0	20.9	1.3	3.4	4.5	0.0	30.1
16-Jul			22.8	16.1	11.8	0.8	51.5
17-Jul	2.2	11.9	0.0	0.0	0.0	0.8	14.8
18-Jul	0.0	0.0	2.2	0.8	0.8	0.0	3.8
19-Jul	6.4	1.6	1.5	0.0	0.8	0.8	11.2
20-Jul	6.5	7.4	0.8	0.0	0.8	0.4	15.9
21-Jul	6.5	3.7	0.8	0.0	0.8	0.0	11.8
22-Jul	6.7	0.0	0.0	0.0	0.8	0.0	7.5
23-Jul	3.2	2.1	6.4	2.9	0.0	0.8	15.6
24-Jul	0.0	1.1	0.8	0.0	0.8	0.0	2.7
25-Jul	2.3	7.0	1.6	4.4	0.8	0.8	16.9
26-Jul	1.4	2.9	0.0	6.1	1.6	0.0	12.1
27-Jul		1.6	0.0		0.0		1.6
28-Jul	0.0	0.0	4.5	1.5	5.3	3.2	14.5
29-Jul	0.0	3.0	0.0	0.0	6.1	0.8	10.0
30-Jul	0.0	0.0	0.8	0.8	0.0	0.0	1.6
31-Jul	0.0	0.0	0.0	1.1	0.8	0.0	1.9
Total	41.0	83.6	99.9	51.9	45.0	9.2	330.6
%	12.4	25.3	30.2	15.7	13.6	2.8	100.0

Appendix C1. Summary of coho salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1999.

Date	Number of Stations	Mean Fishing Time (min)	Catch		CPUE	
			Daily	Cumul.	Daily	Cumul.
01-Jul	6	218.5	0	0	0.0	0.0
02-Jul	6	221.5	0	0	0.0	0.0
03-Jul	6	217.0	0	0	0.0	0.0
04-Jul	6	238.0	1	1	0.8	0.8
05-Jul	6	198.5	0	1	0.0	0.8
06-Jul	6	221.5	0	1	0.0	0.8
07-Jul	6	221.0	0	1	0.0	0.8
08-Jul	6	228.0	1	2	0.8	1.5
09-Jul	6	231.5	3	5	2.2	3.7
10-Jul	6	221.5	0	5	0.0	3.7
11-Jul	6	243.5	7	12	4.5	8.3
12-Jul	6	233.0	5	17	3.7	12.0
13-Jul	6	230.5	13	30	10.1	22.1
14-Jul	6	228.0	7	37	5.7	27.8
15-Jul	6	276.0	9	46	5.1	32.9
16-Jul	4	197.0	52	98	30.3	63.2
17-Jul	6	239.0	12	110	9.2	72.5
18-Jul	6	228.5	3	113	2.4	74.8
19-Jul	6	228.0	14	127	11.0	85.8
20-Jul	1	27.5	9	136	9.6	95.4
21-Jul	0	-6.0	6	142	13.4	108.7
22-Jul	6	225.5	19	161	14.4	123.2
23-Jul	6	229.0	24	185	21.2	144.3
24-Jul	6	239.5	21	206	13.5	157.9
25-Jul	6	229.5	29	235	22.7	180.6
26-Jul	6	216.0	27	262	21.0	201.6
27-Jul	3	113.0	13	275	10.2	211.8
28-Jul	6	232.0	31	306	23.7	235.4
29-Jul	6	244.0	72	378	49.8	285.3
30-Jul	6	219.5	11	389	9.0	294.2
31-Jul	6	209.5	15	404	13.0	307.2

Appendix C2. Estimated coho salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0	0	0	0	0	0	0
02-Jul	0	0	0	0	0	0	0
03-Jul	0	0	0	0	0	0	0
04-Jul	0	0	0	0	1	0	1
05-Jul	0	0	0	0	0	0	0
06-Jul	0	0	0	0	0	0	0
07-Jul	0	0	0	0	0	0	0
08-Jul	0	0	1	0	0	0	1
09-Jul	0	0	1	2	0	0	3
10-Jul	0	0	0	0	0	0	0
11-Jul	0	6	0	1	0	0	7
12-Jul	0	0	5	0	0	0	5
13-Jul	0	2	3	6	2	0	13
14-Jul	0	0	5	1	1	0	7
15-Jul	0	1	1	5	1	1	9
16-Jul			17	14	17	4	52
17-Jul	0	6	0	4	2	0	12
18-Jul	0	0	1	0	1	1	3
19-Jul	1	3	6	1	1	2	14
20-Jul	1	4	1	1	1	1	9
21-Jul	1	1	1	1	1	1	6
22-Jul	2	15	1	0	0	1	19
23-Jul	2	5	2	11	3	1	24
24-Jul	3	13	1	2	2	0	21
25-Jul	9	2	1	15	2	0	29
26-Jul	1	11	7	4	1	3	27
27-Jul		3	9		1		13
28-Jul	0	2	3	4	16	6	31
29-Jul	4	19	0	20	23	6	72
30-Jul	1	1	3	0	0	6	11
31-Jul	0	0	1	3	11	0	15
Total	25	94	70	95	87	33	404
%	6.2	23.3	17.3	23.5	21.5	8.2	100.0

Appendix C3. Estimated coho salmon CPUE by date and station,
Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
02-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
05-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
09-Jul	0.0	0.0	0.7	1.5	0.0	0.0	2.2
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	3.8	0.0	0.7	0.0	0.0	4.5
12-Jul	0.0	0.0	3.7	0.0	0.0	0.0	3.7
13-Jul	0.0	1.2	2.3	4.8	1.7	0.0	10.1
14-Jul	0.0	0.0	4.1	0.8	0.8	0.0	5.7
15-Jul	0.0	0.7	0.7	2.4	0.6	0.7	5.1
16-Jul			9.0	9.0	9.1	3.2	30.3
17-Jul	0.0	4.4	0.0	3.2	1.6	0.0	9.2
18-Jul	0.0	0.0	0.7	0.0	0.8	0.8	2.4
19-Jul	0.7	2.4	4.6	0.8	0.8	1.6	11.0
20-Jul	1.1	3.7	2.7	0.4	0.4	1.2	9.6
21-Jul	1.1	7.5	2.7	0.4	0.4	1.2	13.4
22-Jul	1.5	11.2	0.8	0.0	0.0	0.8	14.4
23-Jul	1.6	3.6	1.9	10.8	2.4	0.8	21.2
24-Jul	2.5	7.0	0.8	1.7	1.6	0.0	13.5
25-Jul	7.0	1.6	1.6	11.0	1.6	0.0	22.7
26-Jul	1.4	8.0	5.3	3.1	0.8	2.3	21.0
27-Jul		2.5	6.9		0.8		10.2
28-Jul	0.0	1.5	2.2	3.0	12.1	4.7	23.7
29-Jul	3.3	14.4	0.0	14.5	12.8	4.9	49.8
30-Jul	0.8	0.8	2.4	0.0	0.0	4.9	9.0
31-Jul	0.0	0.0	0.8	3.2	8.9	0.0	13.0
Total	21.0	74.4	54.9	71.3	58.2	27.3	307.2
%	6.9	24.2	17.9	23.2	18.9	8.9	100.0

Appendix D1. Summary of chinook salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1999.

Date	Number of Stations	Mean Fishing Time (min)	Catch		CPUE	
			Daily	Cumul.	Daily	Cumul.
01-Jul	6	218.5	1	1	0.8	0.8
02-Jul	6	221.5	1	2	0.8	1.6
03-Jul	6	217.0	0	2	0.0	1.6
04-Jul	6	238.0	0	2	0.0	1.6
05-Jul	6	198.5	1	3	0.8	2.4
06-Jul	6	221.5	0	3	0.0	2.4
07-Jul	6	221.0	1	4	0.8	3.3
08-Jul	6	228.0	0	4	0.0	3.3
09-Jul	6	231.5	0	4	0.0	3.3
10-Jul	6	221.5	0	4	0.0	3.3
11-Jul	6	243.5	1	5	0.8	4.1
12-Jul	6	233.0	0	5	0.0	4.1
13-Jul	6	230.5	1	6	0.8	4.9
14-Jul	6	228.0	0	6	0.0	4.9
15-Jul	6	276.0	0	6	0.0	4.9
16-Jul	4	197.0	0	6	0.0	4.9
17-Jul	6	239.0	1	7	0.7	5.6
18-Jul	6	228.5	0	7	0.0	5.6
19-Jul	6	228.0	0	7	0.0	5.6
20-Jul	1	27.5	0	7	0.0	5.6
21-Jul	0	-6.0	0	7	0.0	5.6
22-Jul	6	225.5	0	7	0.0	5.6
23-Jul	6	229.0	0	7	0.0	5.6
24-Jul	6	239.5	0	7	0.0	5.6
25-Jul	6	229.5	0	7	0.0	5.6
26-Jul	6	216.0	0	7	0.0	5.6
27-Jul	3	113.0	0	7	0.0	5.6
28-Jul	6	232.0	0	7	0.0	5.6
29-Jul	6	244.0	0	7	0.0	5.6
30-Jul	6	219.5	0	7	0.0	5.6
31-Jul	6	209.5	0	7	0.0	5.6

Appendix D2. Estimated chinook salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0	0	0	1	0	0	1
02-Jul	0	0	1	0	0	0	1
03-Jul	0	0	0	0	0	0	0
04-Jul	0	0	0	0	0	0	0
05-Jul	0	0	0	0	0	1	1
06-Jul	0	0	0	0	0	0	0
07-Jul	0	0	0	1	0	0	1
08-Jul	0	0	0	0	0	0	0
09-Jul	0	0	0	0	0	0	0
10-Jul	0	0	0	0	0	0	0
11-Jul	0	0	0	0	1	0	1
12-Jul	0	0	0	0	0	0	0
13-Jul	0	0	1	0	0	0	1
14-Jul	0	0	0	0	0	0	0
15-Jul	0	0	0	0	0	0	0
16-Jul			0	0	0	0	0
17-Jul	0	1	0	0	0	0	1
18-Jul	0	0	0	0	0	0	0
19-Jul	0	0	0	0	0	0	0
20-Jul	0	0	0	0	0	0	0
21-Jul	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0
23-Jul	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0
25-Jul	0	0	0	0	0	0	0
26-Jul	0	0	0	0	0	0	0
27-Jul		0	0		0		0
28-Jul	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0
30-Jul	0	0	0	0	0	0	0
31-Jul	0	0	0	0	0	0	0
Total	0	1	2	2	1	1	7
%	0.0	14.3	28.6	28.6	14.3	14.3	100.0

Appendix D3. Estimated chinook salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 1999.

Date	Station Number						Total
	4	5	6	6.5	7	8	
01-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
02-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
03-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
06-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
08-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
12-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
14-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jul			0.0	0.0	0.0	0.0	0.0
17-Jul	0.0	0.7	0.0	0.0	0.0	0.0	0.7
18-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jul		0.0	0.0		0.0		0.0
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.7	1.6	1.6	0.8	0.8	5.6
%	0.0	13.2	28.0	29.4	14.6	14.8	100.0

Appendix E1. Entry pattern of sockeye salmon into Upper Cook Inlet, Alaska,
1999, estimated from daily CPUE measured at the latitude of Anchor Point

Day	Date	Input Y	Estimated Y	Residual	Change in input Y	Change in estimated Y
8	701	0.0062	0.0274	-0.0213		
9	702	0.0116	0.0339	-0.0223	0.0054	0.0064
10	703	0.0127	0.0418	-0.0291	0.0011	0.0079
11	704	0.0392	0.0514	-0.0122	0.0265	0.0096
12	705	0.0518	0.0631	-0.0113	0.0126	0.0117
13	706	0.0609	0.0772	-0.0163	0.0091	0.0141
14	707	0.0673	0.0942	-0.027	0.0063	0.017
15	708	0.089	0.1145	-0.0255	0.0217	0.0203
16	709	0.1138	0.1385	-0.0247	0.0248	0.024
17	710	0.1389	0.1665	-0.0276	0.0251	0.028
18	711	0.203	0.1989	0.004	0.064	0.0324
19	712	0.2361	0.2359	0.0002	0.0331	0.0369
20	713	0.2636	0.2773	-0.0137	0.0275	0.0414
21	714	0.2868	0.3229	-0.0362	0.0232	0.0456
22	715	0.4143	0.3722	0.0421	0.1275	0.0493
23	716	0.4811	0.4243	0.0568	0.0668	0.0521
24	717	0.5383	0.4781	0.0602	0.0572	0.0538
25	718	0.572	0.5324	0.0396	0.0337	0.0543
26	719	0.6018	0.586	0.0158	0.0298	0.0536
27	720	0.6441	0.6376	0.0066	0.0423	0.0516
28	721	0.6725	0.6862	-0.0137	0.0283	0.0486
29	722	0.6853	0.731	-0.0457	0.0128	0.0448
30	723	0.7396	0.7716	-0.032	0.0543	0.0406
31	724	0.7918	0.8077	-0.0159	0.0522	0.0361
32	725	0.8326	0.8392	-0.0066	0.0408	0.0316
33	726	0.8493	0.8665	-0.0171	0.0167	0.0272
34	727	0.8602	0.8897	-0.0295	0.0108	0.0232
35	728	0.8891	0.9093	-0.0202	0.0289	0.0196
36	729	0.9319	0.9257	0.0062	0.0429	0.0164
37	730	0.9385	0.9394	-0.0009	0.0065	0.0136
38	731	0.9432	0.9506	-0.0074	0.0047	0.0113

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Appendix F. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 1999 offshore test fish project.

Date	Station	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Wind Dir^	Tide Stage~	Salinity (ppt)	Water Depth (f)	Secchi (m)	
01-Jul	4	10	8.1	20	4	3	31.8	24	7	
	5	13	8.7	19	4	3	31	37	3.5	
	6	17	8.8	13	4	2	30.7	43.8	4	
	6.5	14	9.2	14	4	4	30.2	43.5	2.5	
	7	13	9.2	11	5	4	30.3	40	2	
	8	17	9.5	5	5	4	30.2	27	2	
	02-Jul	8	21	9	0	0	3	30.5	27	3.5
		7	14	8.7	2	5	3	30.8	37.2	4
6.5		16	8.6	8	4	3	31	42.6	6	
6		15	8.4	11	4	3	31.2	45	7	
5		15	8.4	13	4	3	31.4	42	7	
03-Jul	4	15	8.4	9	4	3	31.6	22.6	9	
	4	18	8.3	5	4	3	31.6	24	10	
	5	15	8.6	8	4	3	31.7	39	9	
	6	17	9.4	13	5	3	30.4	44	8	
	6.5	15	10	11	5	3	30.4	40	3	
	7	16	10	12	5	3	30.6	40	3	
	8	16	9.9	12	5	2	30.1	27	2	
04-Jul	8	13	9.6	15	5	5	30.3	27	2.5	
	7	13	9.5	15	6	4	30.5	42	4	
	6.5	13	9.2	20	6	1	31	44	4	
	6	13	8.8	12	4	3	30.5	45	8	
	5	14	8.2	0	0	3	31.6	35	9	
	4	12	8.3	0	0	3	31.6	25	10	
05-Jul	4	13	8.6	10	5	1	31.8	25	9	
	5	12	8.4	12	5	3	31.7	41	8	
	6	13	8.4	12	5	3	30.4	45	4	
	6.5	15	10.2	12	4	3	30.1	41	4	
	7	16	10.3	14	5	3	30.2	42	3.5	
06-Jul	8	15	10	10	5	3	30.3	24	3	
	8	13	10.1	15	1	4	30	25	2	
	7	12	9.6	12	8	4	30.3	41	3	
	6.5	11	9.7	17	1	4	30.3	42	3.5	
	6	11	9.5	20	1	4	30.8	45	6	
	5	11	8.6	5	1	3	31.7	39	10	
	4	11	8.8	15	1	3	31.9	25	10	
07-Jul	4	13	9	10	5	4	31.9	28	8	
	5	13	9.9	15	5	4	31.1	39	6	
	6	13	9.9	15	5	1	30.4	37	4	

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Appendix F. (p 2 of 5)

Date	Station	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Wind Dir^	Tide Stage~	Salinity (ppt)	Water Depth (f)	Secchi (m)	
07-Jul	6.5	13	10	15	5	3	30.3	45	4	
	7	13	10.3	18	5	3	30	43	2	
	8	15	10.1	18	5	3	30.3	23	2.5	
08-Jul	8	11	9.8	30	5	3	30.4	24	4	
	7	10	9.7	32	5	3	30.3	42	3	
	6.5	11	10.1	30	5	3	29.9	43	3	
	6	10	9.9	25	5	4	30.1	47	3	
	5	11	10.1	25	5	4	30.3	39	8	
	4	11	9.9	18	5	4	31.6	26	9	
09-Jul	4	13	9.3	23	8	4	31.5	25	8.5	
	5	13	9.4	20	8	4	31.3	41	8	
	6	13	9.5	23	8	4	31.5	47	7	
	6.5	14	10.5	23	8	1	30.4	43	4	
	7	14	10	25	8	3	30.6	40	3	
	8	14	10.1	25	8	3	30.7	23	3	
	8	14	10.1	0	0	3	30.6	24	2.5	
10-Jul	7	13	10.1	0	0	3	30	42	3	
	6.5	13	9.9	0	0	3	30.5	42	3	
	6	14	9.5	0	0	2	30.9	44	6	
	5	14	9.2	0	0	4	31.5	40	7	
	4	14	9.2	3	8	4	31.5	26	9	
	11-Jul	4	13	9.7	3	4	2	31.4	23	6
	5	14	9.8	10	4	4	30.2	40	4	
11-Jul	6	14	10.2	0	0	4	30.1	44	5	
	6.5	14	10.2	0	0	4	30.6	43	5	
	7	14	10	12	6	4	30.6	45	3.5	
	8	12	10.3	15	6	1	30.4	25	4	
	12-Jul	8	12	9.9	12	5	3	30.7	26	3
	7	12	10.2	15	5	3	30.2	42	4	
	6.5	11	10	22	5	3	30.4	41	4	
12-Jul	6	12	10	4	6	3	30.5	43	4.5	
	5	11	9.8	28	6	2	31.1	37	5	
	4	11	9.8	18	5	4	31.7	22	8	
	13-Jul	4	14	9.9	8	6	3	31.6	23	6
	5	17	9.8	8	6	3	31	46	6	
	6	14	10.3	10	6	4	30.4	44	2	
	6.5	13	10.1	10	4	4	30.4	42	2.5	
13-Jul	7	13	10.7	5	6	4	30.2	42.4	2.5	
	8	12	10.4	10	6	4	30.4	26	3	
	14-Jul	8	12	10	0	0	30.7	26	2.5	
	7	12	10	8	8	1	30.6	45	3	

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Appendix F. (p 3 of 5)

Date	Station	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Wind Dir [^]	Tide Stage [~]	Salinity (ppt)	Water Depth (f)	Secchi (m)
14-Jul	6.5	12	9.8	8	8	3	30.8	46	4.5
	6	12	10.1	5	1	3	30.4	46	4.5
	5	12	10.9	5	1	3	30.9	39	5
	4	12	9.5	5	1	2	31.8	25	7
15-Jul	4	12	9.5	8	5	3	31.6	23	7
	5	12	10.4	8	5	3	30.3	40	4
	6	13	10.4	10	5	3	30.3	43	2
	6.5	13	10.2	10	5	3	30.1	45	2
16-Jul	7	12	10.8	18	4	4	30.1	45	2.5
	8	12	10.2	18	5	1	30.5	26	1.5
	8	12	10.3	20	4	4	30.4	26	2.5
	7	11	10.2	25	4	1	30.5	45	2.5
17-Jul	6.5	11	10.1	22	4	3	30.6	46	3
	6	11	10.2	28	4	3	30.5	42	3
	4	11	9.2	25	4	3	32	24	7
	5	13	10.4	25	4	3	30.4	38	6
18-Jul	6	13	11	25	4	3	29.4	42	1.5
	6.5	13	10.8	20	4	2	29.8	43	1.5
	7	13	11	20	6	4	29.4	44	2
	8	13	10.9	18	6	4	30	25	2
19-Jul	8	12	10.7	10	1	4	30.1	26	1.5
	7	12	10.4	10	1	4	30.2	43	3
	6.5	12	10.5	15	4	4	30.2	45	4
	6	12	9.6	18	1	3	31.2	46	5
20-Jul	5	12	9.5	20	1	3	31.5	38	7
	4	12	9.4	22	8	3	31.6	25	8
	4	12	9.5	8	4	3	31.6	25	8
	5	12	9.7	8	4	3	31.3	38	7.5
21-Jul	6	13	10.8	8	4	3	30	45	3
	6.5	14	10.8	10	4	3	29.9	43	3
	7	14	10.8	12	5	3	29.9	42	2.5
	8	13	10.8	12	5	3	29.9	27	2
20-Jul	8	-1	-1	-1	-1	-1	-1	-1	-1
	7	-1	-1	-1	-1	-1	-1	-1	-1
	6.5	-1	-1	-1	-1	-1	-1	-1	-1
	6	-1	-1	-1	-1	-1	-1	-1	-1
21-Jul	5	15	10.8	34	4	1	29.7	37	4
	4	-1	-1	-1	-1	-1	-1	-1	-1
	4	-1	-1	-1	-1	-1	-1	-1	-1
	5	-1	-1	-1	-1	-1	-1	-1	-1
21-Jul	6	-1	-1	-1	-1	-1	-1	-1	-1

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Appendix F. (p 4 of 5)

Date	Station	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Wind Dir^	Tide Stage~	Salinity (ppt)	Water Depth (f)	Secchi (m)
21-Jul	6.5	-1	-1	-1	-1	-1	-1	-1	-1
	7	-1	-1	-1	-1	-1	-1	-1	-1
	8	-1	-1	-1	-1	-1	-1	-1	-1
22-Jul	4	18	11.1	10	4	4	29.7	24	4
	5	18	11.2	5	4	4	29.7	37	5
	6	19	11.4	5	4	4	29.2	45	3.5
	6.5	18	11.8	0	0	1	28.8	44	3
	7	17	12	0	0	3	28.4	45	3
23-Jul	8	17	11.2	3	5	3	29.5	26	4
	8	13	11.5	12	6	3	29	28	2.5
	7	13	11.7	15	4	3	28.4	42	3
	6.5	14	11.9	15	4	3	27.9	42	3
	6	13	12.1	5	5	2	27.1	44	3
24-Jul	5	15	11.4	3	5	4	29.7	39	5
	4	15	10.4	0	0	4	31.4	25	9
	4	15	10.3	5	1	2	31.1	24	6
	5	14	11.4	5	8	4	29.3	37	5
	6	14	12.4	0	0	4	26.8	46	3
25-Jul	6.5	14	12.5	0	0	4	26.5	42	3
	7	14	12.5	5	6	1	26.5	45	3
	8	13	11.9	5	6	3	28.2	26	3
	8	13	11.1	20	5	3	29.1	25	3
	7	13	11.9	20	5	3	27.4	42	3
26-Jul	6.5	13	12	25	5	3	26.4	43	3
	6	13	12.2	20	5	2	26.2	44	3
	5	13	11.8	22	5	4	27.6	39	4
	4	13	10.4	18	6	4	31	25	7
	4	13	10.7	18	6	4	30.8	25	7
27-Jul	5	13	11.2	20	6	4	29.8	38	7
	6	14	12	20	5	4	26.9	47	4
	6.5	14	12.6	25	5	4	26.2	47	4
	7	14	12	20	5	1	28	44	3
	8	13	11.6	18	4	3	29.1	26	3
28-Jul	7	13	11.2	25	6	3	29.2	44	2.5
	6	13	11.3	30	6	3	29	46	4
	5	13	11.2	30	6	3	29	37	5
28-Jul	4	15	10.7	5	6	3	30.6	24	6
	5	15	10.4	5	6	3	30.7	36	7
	6	16	10.9	5	6	2	30.1	46	5
	6.5	16	10.8	0	0	4	30.1	43	3.5
	7	16	11.5	0	0	4	21.9	43	2.5

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Appendix F. (p 5 of 5)

Date	Station	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Wind Dir^	Tide Stage~	Salinity (ppt)	Water Depth (f)	Secchi (m)
28-Jul	8	16	11.4	0	0	4	29	28	3
29-Jul	8	13	11.3	12	6	1	29.3	27	2.5
	7	13	11.1	12	6	3	29.5	44	3
	6.5	13	11.2	15	4	3	29.5	43	3
	6	13	10.9	15	4	3	29.8	44	3
	5	13	10.1	10	6	3	31.1	44	6
	4	13	10.1	10	6	2	31	23	6
30-Jul	4	12	10.5	10	6	3	31.2	23	6
	5	13	10.5	10	6	3	30.5	37	4
	6	13	10.7	10	6	3	30.2	42	3.5
	6.5	13	11.5	18	4	2	29.1	42	3
	7	13	11.1	15	6	1	29.6	42	2.5
31-Jul	8	12	11.1	15	6	4	29.6	28	1.5
	8	13	11.1	0	0	4	29.8	26	2
	7	13	10.8	0	0	1	30.2	45	4
	6.5	13	10.4	0	0	3	30.5	43	5
	6	13	10.6	0	0	3	30.4	45	5
	5	12	9.7	0	0	3	30.1	38	9
	4	12	9.9	0	0	3	31.1	23	8

^ Wind direction code 1=north, 2=northeast, 3=east, 4=southeast, 5=south, 6=southwest, 7=west, 8=northwest
 ~ Tide stage code 1=high, 2=low, 3=ebb, 4=flood

Appendix G1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska. Made during the conduct of the 1999 season.

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
 Fit of 1999 data to 1979-1998 data

You need to enter data only in cells with light gray shading.
 You can sort the following list by MSS to rank estimates in order of best fit

Year	MSS	Estimated Total CPUE			Timing
		Current	Previous Day	Difference	
1979	0.02266	999	863	136	Early 5 days
1980	0.06459	821	691	130	Early 9 days
1981	0.06147	798	673	125	Early 9 days
1982	0.00400	1,811	1,603	208	Late 2 days
1983	0.00310	1,689	1,523	166	On Time
1984	0.01586	1,098	956	142	Early 4 days
1985	0.00750	1,565	1,376	189	On Time
1986	0.00516	1,664	1,477	187	Late 1 day
1987	0.00175	2,291	2,073	218	Late 2 days
1988	0.01126	1,308	1,144	164	Early 2 days
1989	0.01723	1,356	1,165	191	On Time
1990	0.00021	2,931	2,797	134	Late 3 days
1991	0.00158	2,067	1,886	181	Late 2 days
1992	0.00046	2,332	2,195	137	Late 2 days
1993	0.00496	1,462	1,307	155	Early 1 day
1994	0.00234	2,285	2,048	237	Late 4 days
1995	0.00212	1,640	1,497	143	On Time
1996	0.00357	1,356	1,227	129	Early 2 days
1997	0.00447	1,755	1,561	194	Late 1 day
1998	0.00452	1,912	1,691	221	Late 1 day
TOTAL RUN THROUGH		15 July	1,590,815		
Escapement				252,815	
Above Sonar					219,839
Below Sonar					0
Unassessed (15% of total assessed)					32,976
Cumulative Catch				885,000	
Daily Drift					294,633
Daily Set					25,677
Residual in District				453,000	
Drift (40% exploitation, if full district; 25%, if reduced district)					442,000
Set (70% exploitation)					11,000
1999 cumulative cpue		977 through	15 July		
1999 cumulative cpue		977 through	15 July		

Offshore Test Fishing Total Run Estimates for 1999										
Passage Rate (Total Run/Cumulative CPUE)					1,628	Based on	15 July	harvest		
Total cpue for season, if 15 July is 50% point:					1,954					
Run Estimate Based on Average Timing (15 July 50% Point)					3,181,630					
Run Remaining					1,590,815					
Run Estimates Based on Model Results (Fit of Current Year to Past Years)										
Year	MSS	Estimated Total CPUE			Estimated Total Run	Timing	Run Remaining	Mean/Day		
		Current	Previous Day	Difference						
1979	0.02266	999	863	136	1,626,637	Early 5 days	35,822		2	
1980	0.06459	821	691	130	1,336,806	Early 9 days	(254,009)		(11)	
1981	0.06147	798	673	125	1,299,355	Early 9 days	(291,459)		(13)	
1982	0.0040	1,811	1,603	208	2,948,788	Late 2 days	1,357,973		60	
1983	0.00310	1,689	1,523	166	2,750,139	On Time	1,159,325		51	
1984	0.01586	1,098	956	142	1,787,835	Early 4 days	197,020		9	
1985	0.00750	1,565	1,376	189	2,548,235	On Time	957,420		42	
1986	0.00516	1,664	1,477	187	2,709,433	Late 1 day	1,118,618		49	
1987	0.00175	2,291	2,073	218	3,730,355	Late 2 days	2,139,540		94	
1988	0.01126	1,308	1,144	164	2,129,771	Early 2 days	538,956		24	
1989	0.01723	1,356	1,165	191	2,207,927	On Time	617,112		27	
1990	0.00021	2,931	2,797	134	4,772,445	Late 3 days	3,181,630		140	
1991	0.00158	2,067	1,886	181	3,365,624	Late 2 days	1,774,809		78	
1992	0.00046	2,332	2,195	137	3,797,114	Late 2 days	2,206,299		97	
1993	0.00496	1,462	1,307	155	2,380,523	Early 1 day	789,708		35	
1994	0.00234	2,285	2,048	237	3,720,585	Late 4 days	2,129,771		93	
1995	0.00212	1,640	1,497	143	2,670,355	On Time	1,079,540		47	
1996	0.00357	1,356	1,227	129	2,207,927	Early 2 days	617,112		27	
1997	0.00447	1,755	1,561	194	2,857,605	Late 1 day	1,266,790		56	
1998	0.00452	1,912	1,691	221	3,113,243	Late 1 day	1,522,428		67	

Total Run Estimate Based on Offshore Test Fishing Information					
Assume 15 July is mean 50% point of run across transect (On Time)					
Fit of 1999 data to 1979-1998 data					
You need to enter data only in cells with light gray shading.					
You can sort the following list by MSS to rank estimates in order of best fit					
Estimated Total CPUE					
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.03300	1,389	1,323	66	Early 5 days
1980	0.08280	1,229	1,154	75	Early 9 days
1981	0.08214	1,193	1,120	73	Early 9 days
1982	0.00630	2,277	2,222	55	Late 2 days
1983	0.00444	2,037	2,001	36	On Time
1984	0.02354	1,487	1,424	63	Early 4 days
1985	0.00996	2,022	1,961	61	On Time
1986	0.00696	2,089	2,038	51	Late 1 day
1987	0.00220	2,683	2,660	23	Late 2 days
1988	0.01562	1,729	1,666	63	Early 2 days
1989	0.02155	1,869	1,789	80	On Time
1990	0.00032	2,942	3,006	(64)	Late 3 days
1991	0.00208	2,384	2,366	18	Late 2 days
1992	0.00058	2,472	2,493	(21)	Late 2 days
1993	0.00743	1,822	1,776	46	Early 1 day
1994	0.00292	2,749	2,711	38	Late 4 days
1995	0.00328	1,927	1,900	27	On Time
1996	0.00633	1,659	1,620	39	Early 2 days
1997	0.00595	2,184	2,135	49	Late 1 day
1998	0.00577	2,401	2,345	56	Late 1 day
TOTAL RUN THROUGH		19 July		2,523,600	
Escapement				441,600	
Above Sonar				334,000	
Below Sonar				50,000	
Unassessed (15% of total assessed)				57,600	
Cumulative Catch				1,536,000	
Daily Drift				334,000	
Daily Set				107,000	
Residual in District				546,000	
Drift (40% exploitation, if full district; 25%, if reduced district)				501,000	
Set (70% exploitation)				45,000	
1999 cumulative cpue	977	through	15 July		
1999 cumulative cpue	1,420	through	19 July		

Offshore Test Fishing Total Run Estimates for 1999										
Passage Rate (Total Run/Cumulative CPUE)					1,777	Based on	19 July	harvest		
Total cpue for season, if 15 July is 50% point:					1,954					
Run Estimate Based on Average Timing (15 July 50% Point)					3,472,616					
Run Remaining					949,016					
Run Estimates Based on Model Results (Fit of Current Year to Past Years)										
Year	MSS	Estimated Total CPUE			Estimated Total Run	Timing	Run Remaining	Mean/Day		
		Current	Previous Day	Difference						
1979	0.0330	1,389	1,323	66	2,468,507	Early 5 days	(55,093)		(2)	
1980	0.08280	1,229	1,154	75	2,184,158	Early 9 days	(339,442)		(14)	
1981	0.08214	1,193	1,120	73	2,120,179	Early 9 days	(403,421)		(16)	
1982	0.00630	2,277	2,222	55	4,046,646	Late 2 days	1,523,046		61	
1983	0.00444	2,037	2,001	36	3,620,122	On Time	1,096,522		44	
1984	0.02354	1,487	1,424	63	2,642,671	Early 4 days	119,071		5	
1985	0.00996	2,022	1,961	61	3,593,464	On Time	1,069,864		43	
1986	0.00696	2,089	2,038	51	3,712,535	Late 1 day	1,188,935		48	
1987	0.00220	2,683	2,660	23	4,768,182	Late 2 days	2,244,582		90	
1988	0.01562	1,729	1,666	63	3,072,750	Early 2 days	549,150		22	
1989	0.02155	1,869	1,789	80	3,321,555	On Time	797,955		32	
1990	0.00032	2,942	3,006	(64)	5,228,473	Late 3 days	2,704,873		109	
1991	0.00208	2,384	2,366	18	4,236,805	Late 2 days	1,713,205		69	
1992	0.00058	2,472	2,493	(21)	4,393,197	Late 2 days	1,869,597		75	
1993	0.00743	1,822	1,776	46	3,238,028	Early 1 day	714,428		29	
1994	0.00292	2,749	2,711	38	4,885,476	Late 4 days	2,361,876		95	
1995	0.00328	1,927	1,900	27	3,424,632	On Time	901,032		36	
1996	0.00633	1,659	1,620	39	2,948,347	Early 2 days	424,747		17	
1997	0.00595	2,184	2,135	49	3,881,368	Late 1 day	1,357,768		55	
1998	0.00577	2,401	2,345	56	4,267,017	Late 1 day	1,743,417		70	

Total Run Estimate Based on Offshore Test Fishing Information					
Assume 15 July is mean 50% point of run across transect (On Time)					
Fit of 1999 data to 1979-1998 data					
You need to enter data only in cells with light gray shading.					
You can sort the following list by MSS to rank estimates in order of best fit					
Year	MSS	Estimated Total CPUE			Timing
		Current	Previous Day	Difference	
1979	0.03555	1,691	1,639	52	Early 5 days
1980	0.08291	1,582	1,523	59	Early 9 days
1981	0.08443	1,543	1,484	59	Early 9 days
1982	0.00521	2,416	2,393	23	Late 2 days
1983	0.00387	2,148	2,124	24	On Time
1984	0.02493	1,765	1,717	48	Early 4 days
1985	0.00881	2,221	2,188	33	On Time
1986	0.00600	2,243	2,216	27	Late 1 day
1987	0.00173	2,651	2,652	(1)	Late 2 days
1988	0.01508	1,972	1,931	41	Early 2 days
1989	0.01964	2,166	2,120	46	On Time
1990	0.00150	2,601	2,631	(30)	Late 3 days
1991	0.00164	2,380	2,373	7	Late 2 days
1992	0.00080	2,341	2,345	(4)	Late 2 days
1993	0.00721	1,996	1,963	33	Early 1 day
1994	0.00226	2,757	2,755	2	Late 4 days
1995	0.00310	2,031	2,006	25	On Time
1996	0.00736	1,844	1,807	37	Early 2 days
1997	0.00499	2,316	2,293	23	Late 1 day
1998	0.00468	2,529	2,509	20	Late 1 day
TOTAL RUN THROUGH		25 July	3,304,766		
Escapement				917,700	
Above Sonar					698,000
Below Sonar					100,000
Unassessed (15% of total assessed)					119,700
Cumulative Catch				1,841,066	
Daily Drift					0
Daily Set					0
Residual in District				546,000	
Drift (40% exploitation, if full district; 25%, if reduced district)					501,000
Set (70% exploitation)					45,000
1999 cumulative cpue		977 through	15 July		
1999 cumulative cpue		1,964 through	25 July		

Offshore Test Fishing Total Run Estimates for 1999								
Passage Rate (Total Run/Cumulative CPUE)					1,683	Based on	25 July	harvest
Total cpue for season, if 15 July is 50% point:					1,954			
Run Estimate Based on Average Timing (15 July 50% Point)					3,287,939			
Run Remaining					(16,827)			
Run Estimates Based on Model Results (Fit of Current Year to Past Years)								
Year	MSS	Estimated Total CPUE			Estimated Total Run	Timing	Run	
		Current	Previous Day	Difference			Remaining	Mean/Day
1979	0.03555	1,691	1,639	52	2,845,397	Early 5 days	(459,369)	(20)
1980	0.08291	1,582	1,523	59	2,661,986	Early 9 days	(642,780)	(27)
1981	0.08443	1,543	1,484	59	2,596,361	Early 9 days	(708,405)	(30)
1982	0.00521	2,416	2,393	23	4,065,333	Late 2 days	760,567	32
1983	0.00387	2,148	2,124	24	3,614,377	On Time	309,611	13
1984	0.02493	1,765	1,717	48	2,969,914	Early 4 days	(334,852)	(14)
1985	0.00881	2,221	2,188	33	3,737,212	On Time	432,446	18
1986	0.0060	2,243	2,216	27	3,774,231	Late 1 day	469,465	20
1987	0.00173	2,651	2,652	(1)	4,460,761	Late 2 days	1,155,995	49
1988	0.01508	1,972	1,931	41	3,318,227	Early 2 days	13,461	1
1989	0.01964	2,166	2,120	46	3,644,666	On Time	339,900	14
1990	0.00150	2,601	2,631	(30)	4,376,627	Late 3 days	1,071,861	46
1991	0.00164	2,380	2,373	7	4,004,757	Late 2 days	699,991	30
1992	0.00080	2,341	2,345	(4)	3,939,133	Late 2 days	634,367	27
1993	0.00721	1,996	1,963	33	3,358,611	Early 1 day	53,845	2
1994	0.00226	2,757	2,755	2	4,639,124	Late 4 days	1,334,358	57
1995	0.00310	2,031	2,006	25	3,417,505	On Time	112,739	5
1996	0.00736	1,844	1,807	37	3,102,845	Early 2 days	(201,921)	(9)
1997	0.00499	2,316	2,293	23	3,897,066	Late 1 day	592,300	25
1998	0.00468	2,529	2,509	20	4,255,475	Late 1 day	950,709	40

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
 Fit of 1999 data to 1979-1998 data

You need to enter data only in cells with light gray shading.
 You can sort the following list by MSS to rank estimates in order of best fit

Estimated Total CPUE						
Year	MSS	Current	Previous Day	Difference	Timing	
1979	0.03697	1,850	1,809	41	Early 5 days	
1980	0.08193	1,765	1,719	46	Early 9 days	
1981	0.08455	1,729	1,683	46	Early 9 days	
1982	0.00461	2,456	2,444	12	Late 2 days	
1983	0.00377	2,210	2,191	19	On Time	
1984	0.02606	1,910	1,873	37	Early 4 days	
1985	0.00818	2,299	2,278	21	On Time	
1986	0.00554	2,305	2,287	18	Late 1 day	
1987	0.00157	2,615	2,619	(4)	Late 2 days	
1988	0.01494	2,088	2,058	30	Early 2 days	
1989	0.01831	2,283	2,254	29	On Time	
1990	0.00182	2,506	2,519	(13)	Late 3 days	
1991	0.00143	2,385	2,378	7	Late 2 days	
1992	0.00074	2,326	2,322	4	Late 2 days	
1993	0.00751	2,091	2,065	26	Early 1 day	
1994	0.00201	2,721	2,726	(5)	Late 4 days	
1995	0.00347	2,106	2,084	22	On Time	
1996	0.00890	1,960	1,928	32	Early 2 days	
1997	0.00450	2,364	2,349	15	Late 1 day	
1998	0.00408	2,554	2,546	8	Late 1 day	
TOTAL RUN THROUGH		29 July	3,748,954			
Escapement					1,266,150	
Above Sonar					1,051,000	
Below Sonar					50,000	
Unassessed (15% of total assessed)					165,150	
Cumulative Catch					2,249,804	
Daily Drift					144,830	
Daily Set					41,055	
Residual in District					233,000	
Drift (40% exploitation, if full district; 25%, if reduced district)					216,000	
Set (70% exploitation)					17,000	
1999 cumulative cpue		977 through	15 July			
1999 cumulative cpue		2,199 through	29 July			

Offshore Test Fishing Total Run Estimates for 1999										
Passage Rate (Total Run/Cumulative CPUE)					1,705	Based on	29 July	harvest		
Total cpue for season, if 15 July is 50% point:					1,954					
Run Estimate Based on Average Timing (15 July 50% Point)					3,331,267					
Run Remaining					(417,687)					
Run Estimates Based on Model Results (Fit of Current Year to Past Years)										
Year	MSS	Estimated Total CPUE			Estimated Total Run	Timing	Run Remaining	Mean/Day		
		Current	Previous Day	Difference						
1979	0.03697	1,850	1,809	41	3,153,963	Early 5 days	(594,991)	(25)		
1980	0.08193	1,765	1,719	46	3,009,051	Early 9 days	(739,903)	(31)		
1981	0.08455	1,729	1,683	46	2,947,677	Early 9 days	(801,277)	(34)		
1982	0.00461	2,456	2,444	12	4,187,099	Late 2 days	438,145	18		
1983	0.00377	2,210	2,191	19	3,767,707	On Time	18,753	1		
1984	0.02606	1,910	1,873	37	3,256,254	Early 4 days	(492,700)	(21)		
1985	0.00818	2,299	2,278	21	3,919,438	On Time	170,484	7		
1986	0.00554	2,305	2,287	18	3,929,668	Late 1 day	180,714	8		
1987	0.00157	2,615	2,619	(4)	4,458,169	Late 2 days	709,215	30		
1988	0.01494	2,088	2,058	30	3,559,716	Early 2 days	(189,238)	(8)		
1989	0.01831	2,283	2,254	29	3,892,161	On Time	143,207	6		
1990	0.00182	2,506	2,519	(13)	4,272,341	Late 3 days	523,387	22		
1991	0.00143	2,385	2,378	7	4,066,055	Late 2 days	317,101	13		
1992	0.00074	2,326	2,322	4	3,965,469	Late 2 days	216,515	9		
1993	0.00751	2,091	2,065	26	3,564,831	Early 1 day	(184,123)	(8)		
1994	0.00201	2,721	2,726	(5)	4,638,883	Late 4 days	889,929	37		
1995	0.00347	2,106	2,084	22	3,590,403	On Time	(158,551)	(7)		
1996	0.00890	1,960	1,928	32	3,341,496	Early 2 days	(407,458)	(17)		
1997	0.00450	2,364	2,349	15	4,030,253	Late 1 day	281,299	12		
1998	0.00408	2,554	2,546	8	4,354,174	Late 1 day	605,220	25		

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